U. S. National Library of Medicine

FOREWORD

Three memoranda that follow provide the reader with the why and wherefore of this sketch of the National Library of Medicine.

The meeting on June 17, 1968, was attended by some twenty people representing the several lines of the NIH family. The Chairman transmitted guidelines for developing the story. Only the most significant events were to be included and only the top staff identified. At one point each of the divisions was allotted a total of five pages for its story, but this restriction was ultimately relaxed. A part of the story was to be written for all by the Office of the Director, NIH. The Library's offer to do all of its own story was accepted.

The Chief, Office of Public Information and Publications Management, was about to leave the National Library of Medicine. The writer volunteered to produce a draft of the document based on the Annual Reports of the Library and conversations with key members of the staff. The first draft entitled "In the Day of LBJ" was circulated for comment to Drs. Cummings, Leiter and Wilson, and revised accordingly. The revised version, however, still contained factual errors, corrected by Mr. Russell.

So this sketch is a group effort sent forward on schedule today. Only time will tell what the final version may contain.

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July 24, 1968

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UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
~~PUBLIC HEALTH SERVICE~~
OFFICE OF THE SECRETARY

COPY

O : Listed Below

DATE: June 3, 1968

ROM : Ralph K. Huitt
Assistant Secretary for Legislation

UBJECT :

The President has assigned high priority in the last months of his term to the collection and preparation of materials for the Lyndon B. Johnson Library in Texas which will tell the story of his Administration to the future. The Secretary has asked me to coordinate the efforts of the Department to present its own story completely and accurately. I need your help.

Many categories of materials will go in the Library--oral histories; personal papers; microfilmed documents; photographs, films and exhibits; and histories of departments and agencies. It is with the last item--the departmental history--that I need immediate assistance.

The history of the Department will be a long narrative, backed up by all the relevant documents. The purpose of it is to make the main events of the last six years immediately available to scholars, who otherwise might have to wait ten years for the complete papers to be indexed and arranged coherently. The Department's history is to be organized in this way:

1. Organizational changes
2. Personnel and staff changes
3. Program changes
4. Operating methods
5. Inter-agency relations
6. Legislative relations
7. External relations--labor, business, etc.
8. Changes in character or emphasis
9. Legislative history

What we must have by next Friday, June 7, is a detailed outline, with all of the items which should go under each heading.

Because the deadline is so short, I must ask each of you to get to me by the end of the day on Wednesday, June 5, the detailed outline for your own agency.

HELP ELIMINATE WASTE HEW COST REDUCTION PROGRAM

May I also ask that each of you appoint a person who will be in charge of this project for your agency and send me his name by close of business, Monday, June 3. Mr. Irvin Walker, who will have the primary responsibility for the management of this task, will then establish immediate and continuous liaison with your representative.

I will be most grateful for your assistance in providing this invaluable record of six years of association and collective effort.

Addressees:

Mr. Donald F. Simpson
Dr. Philip R. Lee
Mr. Harold Howe, II
Miss Mary E. Switzer
Mr. Robert M. Ball
Dr. James L. Goddard
Dr. James A. Shannon
Dr. Robert Q. Marston

cc: The Secretary
Dr. Paul A. Miller
Mr. Alanson W. Willcox
Mr. Alvin L. Schorr
Dr. Alice M. Rivlin
Mr. James F. Kelley
Mr. Irvin E. Walker

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

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TO : Dr. Martin M. Cummings, Director
National Library of Medicine

DATE: June 12, 1968

FROM : Director, Office of Program Planning

SUBJECT: History of NIH Requested by White House

Plans are being made for the establishment of the Lyndon B. Johnson presidential library. This library will contain the personal papers of President Johnson, of cabinet members, undersecretaries, other government executives, and citizens who have been influential in governmental affairs. It will be used by historians and by others who wish to study American government of the period 1963 - 1969.

We have been asked by the White House to prepare a history of the National Institutes of Health, covering the period 1963 - 1969, for the Johnson library. See the enclosed memorandum from Assistant Secretary Huitt. Our history would provide a background for students interested in Federal health activities. It would suggest studies they might undertake, give them leads they might follow, and provide the names of persons they might interview. It will provide an opportunity for those who have been involved in major events at NIH to put on paper for posterity an account of events in which they have participated.

Because of the short time available for the project (our deadline is August 9), I am requesting that you assign a person within your organization to contribute portions of this history. I have designated Dr. Wyndham D. Miles (Ext. 63006) to coordinate the project. Would you please ask your representative to attend a meeting on this subject, Monday, June 17 at 3:00 P.M., in Conference Room 4, Building 31.

MILO D. LEAVITT, JR.

Enclosure

cc: Directors of Institutes,
Divisions, and OD Offices

HELP ELIMINATE WASTE HEW COST REDUCTION PROGRAM

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NATIONAL LIBRARY OF MEDICINE

Director, Office of Program Planning, NIH

June 14, 1968

Director, National Library of Medicine

History of NIH Requested by White House

In reply to your memorandum of June 12, we are pleased to designate Dr. G. Burroughs Mider to represent the National Library of Medicine in developing the subject history. He will attend your meeting on Monday, June 17, at 3 o'clock in Conference Room 4, Building 31.

(signed)

Martin M. Cummings, M.D.

THE NATIONAL LIBRARY OF MEDICINE

1963-1968

The National Library of Medicine, lineal descendant of the Library of the Surgeon General's Office (U.S. Army) founded in 1836, moved to its new building on the reservation of the National Institutes of Health in Bethesda, Maryland, during April 1962. Dr. Frank Bradway Rogers, Director from its inception as a National Library in 1956 and last Director of the Army Medical Library, the immediate organizational predecessor, retired on August 31, 1963.

When President Johnson took office, the Library was a vigorous organization entering a period of innovation, discovery, challenge and response in meeting its statutory obligation to "assist the advancement of medical and related sciences, and to aid the dissemination and exchange of scientific and other information important to the progress of medicine and to the public health."

Governance was vested in the Director and a Board of Regents composed of ten distinguished citizens appointed by the President to four-year terms as of August 3, the anniversary of its establishment in 1956 by Public Law 84-941, and seven Federal officials serving ex officio. The Board's composition on that date in 1963, with subsequent changes in its membership, is shown in Table I. Most of the staff was concerned with

provision of services to the reader and to the Nation, connoted under the organizational titles, Bibliographic Services, Reference Services, and Technical Services Divisions.

These people produced the Catalog of the National Library of Medicine--an annual listing of its receipts last printed in 1964, a quinquennial version finally eliminated in 1965, and the Index Medicus, a compendium of selected biomedical journal article citations published by computer monthly, and a biweekly Current Catalog of all current Library acquisitions. A small staff was concerned with the History of Medicine, and an even smaller one guided extramural programs concerned with translation and special publications. The Office of the Director provided leadership essential to a vigorous organization and the administrative machinery required to assure prudent expenditure of public funds.

Martin Marc Cummings, M.D., of New Jersey, graduate of Bucknell and Duke Universities, became Director of the National Library of Medicine on January 1, 1964. His already distinguished career had included responsible positions at the University of Oklahoma and in the Federal service with the Veterans Administration and the Public Health Service, at the Communicable Disease Center and the National Institutes of Health.

Just before Dr. Cummings assumed the Directorship, the Board of Regents sanctioned a considerable expansion of the Library's collecting policies and expansion of its extramural program. With regard to the latter, the Comptroller General of the United States ruled on March 3, 1964,

that provisions of the Public Health Service Act could be employed to make grants for the support of biomedical communication activities; therefore, a Publications and Translations Division and a Research and Training Division to recognize the expanded activities of a formalized Extramural Program.

Changes ensuing during the past five years have reflected the changing scene resulting from new technology that has greatly increased the facility of communication, or public concern for newly identified national problems to which the Library can contribute important information and support.

The growth of functions rather than the growth of the personnel complement (Table II) and the diversity and complexity of the several new technologies appropriate to the mission of the National Library of Medicine have required the creation of several Associate Directors to assume responsibility for specific day to day operations and serve collectively as an internal advisory group to the Director. Only the Deputy Director, Mr. Scott Adams, was available on January 1, 1964, and his devoted service, a source of great strength to medical libraries in general and the National Library of Medicine in particular, has been recognized by his election to the presidency of the Medical Library Association for 1967-68; he also received the Ida and George Eliot Award in 1964 for his article "Medical Library Resources and their Development." Dr. Marjorie P. Wilson was immediately recruited as Associate Director for Extramural Programs.

Dr. Cummings' arrival at the National Library of Medicine coincided with a new development in communications science that had been in the planning for some time and was about to be implemented as a major innovative step. That story is essential to an understanding of the subsequent evolution of the Library's program.

THE MEDLARS STORY

The card catalog defines what a library contains and where it may be found. Essential to the reader and the staff, it hardly fulfills all of the obligations of a national institution to its public. Consequently, compendia and other compilations of the holdings of the National Library of Medicine and its antecedent organizations have been issued since 1879 in diverse forms, but generally listing subjects and authors. The monthly Current List of Medical Literature was such an operation that grew in physical size and scope until 1950 when a method of manually arranging the publication's entries in sequence for photographing was adopted as the first step in the printing process. This became a bottleneck within ten years even though machine-readable information was added to the imprinted cards to permit mechanized sorting and matching and automatic photography with a Listomatic camera. Such distinct advantages still limited the systems to one particular type of publication, whereas the Library's public requires rapid response to complex requests often specified according to multiple subject axes.

Therefore, during 1961 the National Library of Medicine contracted with the General Electric Company for a single computerized system to satisfy increasing storage and retrieval requirements and to provide for the publication of standard bibliographic documents such as the Index Medicus and its by-products. Thus, the Medical Literature Analysis and Retrieval System--MEDLARS--was born. A detailed story of the early gestation period is told elsewhere (1).

The new system became operational in November 1963. Basically it contained three main parts or subsystems:

1. Input and Conversion Subsystem. Journals, monographs, and other documents are received, indexed and cataloged; a "unit record," consisting of a citation and its associated headings, is prepared for each article, book and serial title; search requests are received and prepared; unit records and search requests are transformed into machine-readable form with punched paper tape or punched cards as the primary medium.

2. Manipulation-Subsystem. A high speed, digital computer accepts the unit records, checks them for the presence and correctness of those elements for which such checks are possible, does some pre-processing to facilitate and speed subsequent activities and stores the unit records on magnetic tape. In response to search requests, it searches the cumulation of unit records for those that qualify for retrieval and edits and composes them for output on magnetic tape.

3. Output Subsystem. This transforms the magnetic tape output into exposed film from which publications may be printed. Unless high quality typography is required, the standard output of the computer's mechanical printer is utilized.

Bibliographic compilations require a controlled vocabulary. At the National Library of Medicine this is termed Medical Subject Headings (MeSH), a dynamic list reflecting the usage of terms in the literature itself and changing to meet new concepts in medicine and its related

sciences. The Library receives each year between 18,000 and 19,000 serial publications of all types. Approximately 2,300 biomedical journals are indexed for input to MEDLARS, of which some 55% are in English. Currently about 700 articles are indexed each day, or about 15,000 new items a month. MeSH contains alphabetical terms but also has been structured into a hierarchical classification or tree structure to facilitate search and retrieval. Originally the work was performed centrally by the Library's staff, but the massive volume-growth rate--almost 200,000 items annually--has demanded some degree of decentralization to capitalize on broad language facility and other specialized capabilities. This has proved quite effective with the help of a MEDLARS Indexing Manual. MeSH is formally published once a year in an alphabetical and categorized arrangement, but several other computer listings are printed when required for internal use by indexers and other specialists.

The original concept of the MEDLARS system included the need for Graphic Arts Composing Equipment, dubbed GRACE, to convert information on magnetic tape to the high-grade typographical display essential to production of the Index Medicus which requires a variety of type fonts. The problem was attacked by two subcontractors. Slippage in the delivery schedule beyond May 1963 required a major decision during the summer: delay the inauguration of MEDLARS or find an alternate way to print Index Medicus. The original production schedule reaffirmed, a crash effort resulted in a set of programs to print Index Medicus on a standard

computer printer with only upper case symbols. Six issues, January to June 1964, were produced in that way, but the July 1964 volume was made by an IBM 1403 Chain Printer capable of producing both upper and lower case letters. GRACE finally arrived during May 1964 (just one year late) and produced the August 1964 issue. The decision to begin production in January proved a good one since the Cumulated Index Medicus for 1964, produced by GRACE, replaced the bulky seven issues made by the computer printer. GRACE remains a prototype machine extremely useful to the National Library of Medicine and apparently to the National Aeronautics and Space Administration which uses the equipment from time to time. On the other hand, repairs necessitate custom-made parts, and the economies to be effected will dictate its replacement in time by a production counterpart.

MEDLARS was to be a decentralized system to improve demand search service by providing regional facilities throughout the country to increase the capacity for searches and make them more responsive to the users. Analysis of the problem favored a plan to contract with existing centers of excellence, thus providing search services in perhaps six to ten universities or other non-profit organizations with good medical libraries and computer resources.

Today these organizations are a part of the MEDLARS network:

University of Colorado (1965)
University of California at Los Angeles (1965)
Harvard University (1966)
University of Alabama (1966)

University of Michigan (1966)
Ohio State University (1967)
Texas Medical Center (1967)
National Institutes of Health (1967)

Colorado, Ohio State, Alabama and Texas are the only organizations currently processing searches. The others are providing search formulations for processing at the National Library of Medicine.

The Ohio State University and the Texas Medical Center at Houston asked for access to the MEDLARS tapes to establish search centers with their own resources. The United Kingdom operates a center for the use of Great Britain, and another successful center is in operation at the Karolinska Institute in Stockholm, Sweden.

Since production of the Index Medicus in January 1964 led to increasing use of MEDLARS to facilitate bibliographic publications, the system was a success, but a qualified success. Computer programs of the Input and Publication Subsystems seemed to work more effectively during the initial year of the program than did the Demand Search Programs. Major deficiencies were discovered in the MeSH vocabulary.

As some anonymous sage wrote, "In order to survive, a system must monitor itself, evaluate its performance, and upgrade it whenever possible" (2). People had to learn how to query MEDLARS lest indiscriminate questions produce an unmanageable list of indigestible titles. Comparison of references contained in reviews written by scientists, notably those at the National Institutes of Health, with the content of the MEDLARS file revealed discrepancies in both directions--the

individual scientist included titles not known to the system, and MEDLARS contained additional pertinent references. Therefore, Mr. F. W. Lancaster joined the staff of the Library in December 1965 to embark on the detailed planning and execution of a test program to evaluate the performance of MEDLARS, aided by an Evaluation Advisory Committee of Federal and non-Federal experts to assure complete impartiality. This was the first large scale evaluation of an open computer based information system.

The report, issued in January 1968 found the system operating on the average at about 58% recall and 50% precision but pointed out that the results, in fact, are widely scattered. Some searches have performed extremely well with high recall accompanied by high precision; others have been virtually useless. The graph in Figure I tells the story. Recall and precision are strongly interconnected in an inverse relationship; hence the greatest potential for improvement in MEDLARS exists at the interface between user and system. The report identifies deficiencies arising from a tendency for compartmentalization of indexing, searching and MeSH requiring greater integration of these activities with greater attention to terminology actually used by clients through expansion of subheadings away from pre-coordinated terms.

In reviewing the original objectives in 1961 of MEDLARS in the cold light of 1968 the following have been entirely accomplished:

"Improve the quality of and enlarge (broaden the scope of) Index Medicus and at the same time reduce the time required to prepare the monthly editions for printing from 20 to 5 days.

"Reduce the need for duplicating total literature screening operations (at other libraries and information centers).

"Permit future expansion to incorporate new and as yet not completely defined--and hence secondary--objectives."

These objectives have been partly accomplished:

"Make possible the production of other compilations similar to Index Medicus in form and content (but in more specific medical subjects and hence smaller in size." Because of the intellectual effort required, development of recurring bibliographies proved to be a much larger job than estimated originally. Nine are in production as compared to the first estimate of fifty.

"Increase the average depth of indexing per article (number of descriptive terms per article) by a factor of five, i.e., ten headings versus two." The medical literature has been divided into the more and less consistently important periodicals. The former, numbering about 850, are indeed indexed in the contemplated depth; the latter, 1450, average

a depth of only four terms. Journals indexed in depth are considered by advisory groups to encompass the most significant publications and research reports. Because these journals are given priority, the proportion of articles indexed in depth has averaged more than 50 percent for the last two years.

"Keep statistics and perform analyses of its own operations to provide the information needed to monitor and improve system effectiveness. Eight separate statistical reports are provided on a monthly, quarterly or annual cycle to management. The point is, other useful reports could be produced but would require more resources, especially people.

Finally, these objectives have not been met:

"Make possible the prompt (a maximum of two days) and efficient servicing of requests for special bibliographies, on both a demand and a recurring basis, regularly searching up to five years of stored computer files." The average turn around time is two weeks. Two-day search will not be possible with the present batch processing system. The characteristics of the search requests have been much more complex than originally anticipated. Consequently, processing requirements have been substantially increased.

"Nearly double the number of articles that may be handled (indexed and entered into the computer) annually--from 140,000 to 250,000 in 1969." Input now approximates 200,000, but attainment of original goal seems improbable.

"Make possible for Index Medicus and other compilations the inclusion of citations derived from other sources, as well as from journal articles." Changed by management decision. Reprogramming for Current Catalog includes citations to books and monographs, but in insufficient depth for MEDLARS. Plans have been made, however, to include in the system citations of individual papers from conferences and symposia but current manpower shortages prevent implementation. The majority of new findings in biomedicine are first reported at such meetings or in the regular periodical literature.

MEDLARS II

The Library is rapidly saturating the capacity of its electronic computers, a Honeywell 800 and a Honeywell 200. While the memory of the current hardware could be increased, other critical factors in the present system such as the limited processing capacity of the computer and the human requirement for development, maintenance and use of the vocabulary demand at least as much consideration if the professionals are to keep up with the needed expansion and the increasing complexity

and sophistication inherent in the current state of the art. New hardware encompassing more sophisticated software capabilities is vital to insure the survival of MEDLARS. Improved user-machine interaction, simple query format, one-line citation sampling, remote terminals of several types will provide direct data communication among the National Library of Medicine, regional medical libraries and other national libraries in developing the following program applications:

1. On-line augmented MeSH vocabulary

   It must be possible to select automatically more comprehensive terms in MEDLARS to represent the more specific terms used by specialized information centers and retain better control of the dynamic interfaces between multiple vocabularies. Dictionary notes, essential to effective vocabulary usage, are kept in a huge card file representing a significant impediment to efficient use of the system and to decentralization of indexing; on-line availability becomes imperative.

2. An automated acquisitions and cataloging system

   Fifteen records now control acquisition, claiming, shelving, and use of the Library's 18,000 serial titles and the other medical literature accumulated since 1801. A single automated file can be queried and used by the staff through appropriate terminals. Publication of catalogs and indexes will be facilitated.

3. On-line indexing and searching

This will eliminate cumbersome and error-prone clerical operations by placing indexed citations directly into the computer file, verify the input and correct any errors immediately. Alternate search strategies can be employed and results sampled to determine the best strategy before the entire file is searched.

4. Training people to operate the system

The eventual goal is to train users of the system to formulate and make their queries directly to the system through use of on-line terminals.

5. A graphic image storage and retrieval system closely linked to the MEDLARS computer search capability.

Close cooperation with the National Bureau of Standards is developing standards adequate to the exacting requirements of interlibrary loan preservation and a storage and retrieval system including the retrieval of abstracts.

6. A drug literature program with chemical search capabilities added to MEDLARS.

It is essential to increase specificity of drug and chemical indexing including trade names and other synonyms.

7. A toxicology information exchange

   In addition to precision of indexing as explained under 6, the system must be sufficiently expansible and flexible to integrate separate geographically dispersed files in being rather than reproduce existing data in a central bank.

8. An intramural research and development program in information retrieval and scientific documentation

   Responsive to investigation of HEW, Report of the Special Subcommittee on Investigation of the Department of Health, Education and Welfare of the Committee on Interstate and Foreign Commerce, House of Representatives, 89th Congress, 2d Session, October 13, 1966, pages 151-152. The specific components are largely those envisioned in accomplishing the objectives already listed.

A draft request for proposal (RFP) for system design, hardware, and software for the new MEDLARS computer installation was forwarded during April 1967 to the Office of Management Policy in the Office of the Secretary, DHEW. Negotiations ensued, and the RFP approved in August was sent to nineteen vendors. Bids were received from six firms totaling seven proposals during November. Evaluation was completed during May 1968 and the contract was awarded to Computer Sciences Corporation in June. The contract finally signed provides for hardware rental through the General Services Administration at a cumulative cost of $2,085,798. The contract, totaling $1,900,000, requires installation and operation of the initial configuration during September 1969 with final completion and operation in December 1971.

THE COLLECTION AND PROGRAMS OF THE NATIONAL LIBRARY OF MEDICINE

The collection of the National Library of Medicine is the largest aggregation of biomedical literature in existence. Books, periodicals, doctoral dissertations, pamphlets and the like, together with non-book material such as portraits, pictures and microfilms are the essential ingredients today, and its growth is depicted in Table III. To this stable but constantly growing base a flourishing technology is adding new information packages in the form of motion pictures, some compactly packaged in capsules for ease of manipulation by any user, tapes of various sorts requiring availability of complicated electronic gear, and computerized data banks geographically dispersed, controlled by Federal or by private interests but accessible to the Library's staff. A new world is emerging for the diffusion of information.

While the collection may be the life's blood of any library, the quality of the blood will not alone determine the effectiveness or efficiency of the organism. That will depend upon the facility with which the organs, cells and tissues can extract from the blood exactly what each requires, free from pollution, and the ease with which it may assimilate the nutrients. Thus a library is people, many people both within and outside its

walls. Some who serve the National Library of Medicine accept the monotony of painstakingly accurate routines, others with skill, imagination and drive innovate to improve the responsiveness of library functions to the needs of its users, but all--staff and users alike--interact constantly to meld their skills and their personal hopes, aspirations and desires into a potent force to accelerate the diffusion of biomedical knowledge for the betterment of mankind.

Management and execution of acquisition, Table IV, cataloging, indexing, reproduction, compilation and reference, Table V, are no small task as performed by the intramural staff. Their growth of 20 percent contrasts strikingly with the overall growth of the total staff of 35 percent, while the aggregate requests for services, Table IV, were growing much more rapidly than the collection. This can only reflect substantial upgrading of the Library's activities through innovation.

The National Medical Library, being a statutory archive, is profoundly disturbed at the implications, affecting all research libraries, of new data on the deterioration and disintegration of paper in books and periodicals. Attempts to capture the content of the publications through microfilming continue, but the losses exceed the effort to photograph material before it is lost entirely. About 10 percent of the entire collection will probably be

deteriorated by 1970. This amounts to 37,000,000 pages. Progress in reproducing deteriorated pages is listed in Table VI.

The biomedical literature is published in many languages--only about 55 percent in English. Hence the staff of the National Library of Medicine has great facility in many languages. On the other hand, it is often more practical and more economical to obtain translations from the homelands of peoples whose native languages represent comparatively small fractions of the world's population or present certain complexities such as characterize many Asiatic tongues. The Library's function is indexing and cataloging, not abstracting, and it constantly strives to improve its products at lower cost.

More than 90 percent of the 150,000 annual requests for interlibrary loans are for specific papers published in the serial literature. The majority of the remainder request items of historical interest. Consequently material from copyrighted monographs is rarely if ever reproduced by the National Library of Medicine. The system originated by Dr. Rogers for processing inter-library loans is a model of efficiency. The requests contain not only the specific reference but a return address. The volumes containing the

needed work are placed in the aisles at the end of their home shelves in the stacks. A "roving camera" photographs the pages on a reel of 35 mm. film fed into a copy flow machine that produces the hard copy automatically, even cutting the pages automatically. It takes only two staples to complete the package for mailing. The impediment to greater efficiency is the 40-hour week. While the reading room is available an average of 74 hours a week, many services are constrained to the normal 8-hour time frame, whereas the cost of expanding the time frame would seem small in relation to the potential benefits. The Library's current manpower capability for this service is saturated, and one hopes that the systematic construction of the biomedical communications network will diffuse this interlibrary loan activity to the regional libraries.

The ability to copy is fundamental to communication of the written word. Hence means of facilitating the delivery of the desired components of the biomedical literature to its users would appear to best serve the public interests. One publisher, however, has entered suit against the National Library of Medicine and the library of the National Institutes of Health charging seven counts of infringement of copyright with reference to specific periodical items.

One of the most rapidly growing services is the demand search via

MEDLARS. A count of the individual requests since introduction of the service in 1965, impressive as it is, does not tell the whole story. With its fingers on its public's pulse the Library staff is acutely conscious of the popularity pendulum as it swings from one area of interest to another. Consequently searches requested on particular timely subjects are refined, reproduced photographically by GRACE, and sent out on request to a much larger number of interested parties. Lists of the available searches of this type are published in leading journals and are circulated on request to increase current awareness.

The Index Medicus and its ancestors are recurring bibliographies of inestimable value to the biomedical community. During 1964 a number of experimental searches were formulated to provide information on construction of other recurring bibliographies on broad but more limited subjects for nationally oriented organizations agreeing to publish and distribute the bibliographies widely on a non-profit basis. The response has been most enthusiastic. By the end of 1965 seven were in production. Today there are twelve listed in Table VII and more are being developed.

All MEDLARS bibliographic products--including recurring bibliographies--are now retrieved from a Compressed Citation File originally designed for demand search processing. Thus MEDLARS has been changed from a two master-file system to a single master-file, which saves at

least 70 hours of machine time per month, reduces file maintenance, and saves the time of search analysts.

With the growth of the Library's programs Dr. Joseph Leiter joined the staff in 1966 to assume responsibility for the direct operations as Associate Director for Intramural Programs. The title was later changed to Associate Director for Library Operations.

Drug Literature Program. The President's budget for Fiscal Year 1966 provided for a coordinated system within the Department of Health, Education, and Welfare for collection, organization and dissemination of information on drugs to involve the National Institutes of Health, the Food and Drug Administration, and the National Library of Medicine. The Library identified drug literature not included in its ongoing collection program to permit expansion of its capabilities. A requirement for greater precision in chemical indexing developed, so an auxiliary chemical module was added to MEDLARS with a view to establishing a computer based file to contain the structures of drugs, their synonyms, a registry number, and reference to articles in which they are discussed. Assistance was sought from Chemical Abstracts, which this year provided a list of some 30,000 chemicals coded in machine-readable form.

During 1966 attention was directed toward improving pharmacological and toxicological terminology with the help of the American Society

for Pharmacology and Experimental Therapeutics and the Society for Toxicology. Special monthly bibliographies on drug toxicity were provided to such organizations as the Food and Drug Administration, and in April an ad hoc Advisory Panel recommended a pilot toxicity bibliography which came into being later in the year as sample copies distributed to a limited number of experts for comment and criticism. Contracts provided for another pilot project, "Drug Digests," summaries of foreign articles on drugs and a second edition of the Russian Drug Index compiled by Stanley Jablonski.

Toxicology Information Program. President Johnson on June 8, 1966, approved a report "Handling of Toxicological Information" prepared by his Science Advisory Committee, which called for a computer-based file of toxicology information. Responsibility for the program was assigned to the National Library of Medicine on August 12. Dr. Charles N. Rice was appointed to head the new program, for which a preliminary proposal was submitted to the Coordinating Committee chaired by Dr. Philip R. Lee, Assistant Secretary for Health and Scientific Affairs, DHEW, in January 1967. The plan addressed itself to the clearinghouse, referral and evaluation functions in a series of evolutionary stages beginning with referral services to sources to be identified by continual surveys and progressing to supply references, documents, data, information or other services

to be determined by continual survey of user needs.

A choice had to be made between using established resources, such as the files of Chemical Abstracts, Biological Abstracts and the Food and Drug Administration, or creating a new system of information wholly within the Library. While this was going on, a study requested by the Bureau of the Budget on future biomedical library needs was being conducted by Herner and Company of Washington, D.C. The Library elected to use presently existing resources to the fullest extent possible, to introduce new facilities, services and products only when necessary, and to seek harmonization and collaboration of all sources and users of toxicological information at all times. The Herner report recommended a biomedical library system created and managed by the Federal Government. The Coordinating Committee accepted the Library's philosophy.

A number of contracts or agreements have subsequently been implemented with other Federal agencies and corporate bodies to construct an advisory structure, identify data banks or other files, and determine user needs. After a few trial balloons had elicited meaningful comments from users of toxicology information, the Toxicity Bibliography Volume I, No. 1 (Jan.-March 1968) was issued early in July 1968. Many agencies, professional organizations and institutions have offered to cooperate with the Toxicology Information Program, for which the Library staff is grateful indeed.

Research and Development Program. Included in the Advisory Report of the Board of Regents for 1966 to the Surgeon General was a recognized need for a major intramural research and development effort to support the information and communications responsibilities of the National Library of Medicine. Members of the Congress gave voice to similar sentiments in testimony before the House Committee on Appropriations during the same year. The Committee report recommended that funds be appropriated and positions be added

> "for development and direction of the Library's application of advanced technology to biomedical communications problems; for studying the application of library and related learning resources to the continuing education of health scientists and practitioners; and for planning and development of the Library's role as a center for biomedical communications."

Dr. Ruth M. Davis, a sophisticated information scientist, was recruited and reported for duty as Associate Director for Research and Development on April 24, 1967.

Within an incredibly short time a program proposal had been developed, agreed to within Health, Education, and Welfare, by the Office of Science and Technology and the Bureau of the Budget, and enthusiastically endorsed by the Board of Regents at their meeting in June 1967. Philosophically the plan is based on the recognition of common needs for communication shared by government agencies, industry and educational institutions and with other collective communities such as intelligence and scientific communications.

It should rely as much as possible on research supported and/or performed by all of these groups rather than attempt to establish within a single department total R & D resources needed to meet its own requirements.

The approach in general terms includes:

Evaluation and observation of communications systems and practices to determine efficiencies and deficiencies and to effect improvements;

Providing immediate improvements to alleviate pressing operational problems;

Application of proved and advanced technology to provide entirely new but improved means for performing communication functions;

Experimentation with and application of new techniques, procedures and equipment;

Advancement of technology that has specific application to known or anticipated communications needs of the biomedical community.

In keeping with these principles, National Library of Medicine research and development efforts will be undertaken only when communications problems:

are unique to the biomedical community;

are of strong professional interest and demand interdisciplinary participation for their successful resolution; and

are not being completely resolved by external on-going R & D but can be materially assisted by participation of the biomedical community.

Much of the current part of "The MEDLARS Story" shows the strong influence of the R & D group to which the Evaluation Study was

promptly transferred. One of its first activities was the establishment of the Remote Information Systems Center (RISC) now housed in a virtual closet to provide on-line terminals affording access to computer centers throughout the United States so that the Library may experiment with new and different techniques of rapid information retrieval.

In short, the National Library of Medicine is in the process of developing with other interested agencies, both public and private, a sophisticated network for facilitating communication among the several segments of the biomedical community as well as with the general public. The Library then becomes the Center for Biomedical Communications, which indeed it has always been, but with new capabilities capitalizing on the most recent technological advances of the late 20th century.

History of Medicine. The important records of society's cultural development are accorded a special reverence in civilizations that have developed other than purely verbal means of communication. Frequently such documents reveal their true impact on social, scientific or technological progress only with the passage of time. The National Library of Medicine contains one of the world's finest collections of historically significant medical documents. Indeed the publication of the catalog of its 16th century (documents) in 1968 was acclaimed far beyond the library fraternity for its excellence of substance and format.

The staff of the Library, however, prefers to play a more active role in medical history. Consequently a venture in "oral history" commenced in 1967 which gathers carefully prepared tape-recorded and transcribed interviews with persons making distinguished contributions to the development of medicine or who have shared in significant events, so that knowledge not otherwise likely to be recorded may be preserved. Many more personages are living than can possibly be interviewed by busy people who have other regular duties. Consequently the staff of the History of Medicine Division will concentrate on a larger number of relatively short interviews rather than a study in depth. The initial venture is the history of surgeons, their training and their professional organizations since 1920.

National Medical Audiovisual Center. Malaria was an important medical problem in fighting World War II when a Malaria Control in War Areas program began in downtown Atlanta, Georgia. A single camera-man-director working in a small loft with borrowed equipment created motion pictures to document such typical activities as spraying, ditch digging and the use of chemical pesticides for training of personnel concerned with malaria eradication. After the war the function was included within the Communicable Disease Center which had much broader responsibilities for the control of infectious disease.

The audiovisual activities grew with the CDC, relating particularly to training activities, but creation of the Medical Audiovisual Branch highlighted the organization's accomplishments, and increased the

demand for services from other components of the Public Health Service. During March 1963 the Surgeon General designated the Branch as the Public Health Service Audiovisual Facility to serve as the focal point for production, utilization and distribution of all audiovisual forms supporting the mission of the Service and allied governmental programs.

The investigation of HEW conducted in 1966 by a Special Subcommittee of the Committee on Interstate and Foreign Commerce, House of Representatives, found broad deficiencies in biomedical communications. The Committee report urged formation of a national biomedical clearinghouse and referral center with the National Library of Medicine serving "as a central switching unit between the many varied sources and users of biomedical information services offered."

It also recommended transfer of control of PHS audiovisual activities from the CDC to the Library "to integrate more closely audiovisual activities with other biomedical communication services." The transfer was effective January 1, 1967, when the organization was renamed the National Medical Audiovisual Center.

The Center remains in Atlanta, occupying some 32,000 feet of space appropriate to its needs and employing no more than 128 people with an annual budget approximating $2,000,000. The challenge is an unquestioned need of educators in the biomedical community for audiovisual systems to aid in meeting the crises of an increasing student

population, an unabated flood of new knowledge and a shortage of faculty. The staff has joined forces with other health professionals throughout the Nation to assure the most advantageous utilization of audiovisual instructional materials for communicating an ever expanding body of medical knowledge to more people than ever before. Virtually every Federal organization concerned with medicine and the biomedical sciences avails itself of the excellent services provided by the NMAC; more than 10 percent of the budget represents reimbursable agreements.

The organizational structure mirrors the functions:

Acquisition, Retention and Distribution;
Audiovisual Systems Planning;
Cataloging and Special Reference;
Educational Studies and Development;
Graphic and Photographic Arts;
Motion Picture and Television.

Some insight into the scope of activities may be gleaned from a brief description of a few significant productions during 1968:

The Price of Survival. Twenty-nine minute, 16 mm. sound color film produced for the Division of Health Mobilization. The film is presented in three parts to permit discussion periods after each segment. The first part presents a simulated disaster and the inadequacy of the affected city in dealing with its aftermath. The second shows the same city planning and preparing for possible future emergencies, and the third part presents an "emergency" drill, an important part of preparation for disaster.

Fluorescent Antibody Detection of Enteropathogenic Escherichia Coli. Fourteen minute, 16 mm. sound color film produced for the National Communicable Disease Center. Demonstrates a method of detecting E. coli. in infants within one hour, encouraging hospital laboratory directors to offer the procedure in the routine examination of infants.

Television in Biomedical Communications. Black and white video tape recording, sound, 15 minutes. Also available on 16 mm. film. A brief, non-technical presentation to persuade viewers that television has definite use in the medical school as a teaching aid.

Five Days of Internal Medicine. Video tape documentation of key speeches and highlights of a seminar on internal medicine, Grady Hospital, Atlanta, Georgia, September 25-29, 1967, provides valuable source material for future duplicate video tapes and film transfers.

Bone Marrow Aspiration. Seven and one-half minute, color, sound, 16 mm. film. Demonstrates the techniques of taking specimens of bone marrow from the sternum and the preparation of smears for staining. For professional audiences only.

Community Action in Agua Prieta. Twenty-minute, 16 mm., sound, color film produced for National Communicable Disease Center. Documents a health and sanitation program accomplished in a small Mexican border town as a demonstration project. Available with Spanish sound track.

Annual Thomas P. Hinman Dental Meeting. The NMAC provided personnel and equipment to telecast and project closed circuit, color television coverage of the major events of this meeting held in Atlanta, Georgia, March 24-27. The audience approximated 1,000 at each presentation.

European Facilities for the Mentally Retarded, Human Reproduction, How to Complete a Certificate of Live Birth, Heart of the Matter, The Work Evaluation Unit, and Diagnosis of Peripheral Nerve Injuries, plus six subjects for the Pan American Sanitary Bureau, represent new slide series and film strips produced on a reimbursable basis.

The International Index of Medical Film Data produced by NMAC now describes more than 32,000 completed motion pictures, audio tapes and film strips. Items from the collection are available both in hard copy

and punched paper tapes to facilitate applications that use data processing systems. Loans of film and tape material are increasing by 30 percent this year to total more than 90,000, but demand for material from the Still Pictures Archives is increasing even more rapidly so that it exceeds the capacity of the staff to respond.

The June 1966 issue of Industrial Photography carries a special report, "Public Health Service Audio-Visual Facility" and contains the following editorial:

Audio-Visuals: A Solution

> "We are living in an age of an information explosion which threatens to engulf us with its sheer magnitude. Whether it is in the field of medicine, science, or the humanities, our over-all accumulation of data is increasing at a rate which defies the imagination. Both the student and the teacher and the practitioner are losing the fight to keep their heads above water in their attempts to absorb knowledge and keep current in the face of mass bodies of facts necessary to their vocation.
>
> "It is becoming evident that the traditional methods of teaching and learning are hopelessly outdated as weapons to win this battle for knowledge, and that new answers must be found if we are to keep up. The medical profession is showing the way in this search for a solution through the pace-setting leadership and example provided by the Public Health Service Audiovisual Facility, whose story we tell in this issue.
>
> "The Facility is presenting the medical field--and thus all the rest of us who share the same problem--with an operating philosophy, approach, and vision which provides the nucleus of a practical solution. Here--under one roof--is a unified concept which looks to sight and sound as the avenues for dealing with the problem. They recognize the need to revamp the old classroom and teacher concepts with modern tools and techniques, which properly utilized and centralized can hope to cope with the sheer overpowering need to keep pace with today's technology.

> "Audio-visuals--motion pictures, slides, filmstrips, television--as we know them today and can already predict for tomorrow, will make learning easier, provide greater retention, and help give us more time for what must be done in the midst of a busy world."

We think so too.

Training. The National Library of Medicine had accepted two or three librarians each year to serve as "library associates" or interns, an on-the-job training program to develop skills required by medical librarians. The program, successful as judged by the responsible positions its graduates obtained in leading American medical libraries, was restructured and somewhat expanded in August 1964 as a Special Training Program to encourage outstanding graduates of American library schools and other qualified specialists to fill appropriate vacancies at the Library. Any vigorous organization that accepts bright young people must provide for their career development, which requires training and continuing education. A period of rotating assignments and in-service training therefore precedes assignments to regular library positions. About 25 percent of the Library's personnel engage in some type of meaningful training annually, the majority of the courses being provided by the Library, but a substantial number participate in other part-time educational pursuits under the Federal Employees' Training Act, while one to five may attend library school under the Library's auspices. The Library is happy to have provided an opportunity for meaningful employment during the summer months, principally under the President's Youth Opportunity Program

commencing in 1967.

But responsibility for training is not confined to the self-interest of the National Library of Medicine. Since 1964 the Extramural Programs staff has engaged with the problems of manpower training and development on the national scene, making grants and awards to support these activities on a limited scale. The ability to cope with the national problem has been enhanced by passage of the Medical Library Assistance Act of 1965 which provided for support of a variety of training activities with an authorization of up to $1,000,000 annually.

The first program supported research in all phases of biomedical librarianship including inter-relationships among local and regional resources centers and their relation to the National Library of Medicine. Negotiations transferred responsibility for projects of a multidisciplinary nature in the history of the life sciences, with special reference to the social, cultural and scientific advancement of medicine, from the National Institute of General Medical Sciences to the National Library of Medicine.

The growing concept of the medical library as the learning resource in the medical complex requires that it assume responsibility for and leadership in servicing new instructional media in addition to its traditional roles. During January 1965 a group of leaders in medical librarianship met with the staff of the National Library of Medicine

to discuss the training of personnel in medical library, information science and communications research. Six new programs were funded through the extramural programs in 1966, marked by diversity in content but all specifically directed to health-related information activities and designed to accommodate trainees who have developed or can develop strong career commitments to the health information field. The program grew modestly in 1967 when five additional internship programs were funded. The Library also joined forces with the Office of Education and the National Science Foundation to support the comprehensive identification and study of manpower requirements, educational needs and utilization patterns of manpower in the library and information professions.

JOHN SHAW BILLINGS CENTENNIAL

Representatives from the White House and the Congress joined other distinguished guests from the biomedical, science, education and library communities on June 17, 1965, at the National Library of Medicine to celebrate the 100th anniversary of Dr. John Shaw Billings' advent as head of the Library of the Surgeon General's Office (U.S.Army). The formal sessions were preceded by a private ceremony at which Colonel Robert Fletcher presented to the Library the Honorary Gold Medal of the Royal College of Surgeons of England awarded to his father, Dr.Robert Fletcher, in 1910. Dr. Fletcher served as Principal Assistant Librarian to the Army Medical Library for many years.

Dr. Norman Q. Brill, Chairman of the Board of Regents, presided over the afternoon session at which the principal speakers were Congressmen John E. Fogarty of Rhode Island and Leo W. O'Brien of New York and Senator Lister Hill of Alabama. Guests toured the Library and viewed a special exhibit of Billings memorabilia, including the Hollerith tabulation equipment developed at Billings' suggestion, the forerunner of modern equipment for automatic data processing.

The evening session featured three historical papers on Dr. Billings' life and career by Dr. Jean A. Curran, Professor Emeritus of the History of Medicine, State University of New York, Miss Bess Furman, author and historian of the Public Health Service, and Dr. Frank B. Rogers,

Librarian of the Denison Memorial Library, University of Colorado Medical Center, and former Director of the National Library of Medicine.

EXTERNAL RELATIONS

The National Library of Medicine enjoys cordial relations with the many private, professional and governmental organizations that comprise the biomedical, educational and library communities. Representatives of these categories have been unstinting in their enthusiastic cooperation with the Library's staff, serving in many ways -- on ad hoc committees, more formal study sections, and the Board of Regents -- to provide the advice and counsel essential to advancing the state of the several arts on which the growth and effectiveness of the Library's programs depend. Much of the assistance has involved technical issues, but close attention to the needs of the diverse sets making up the Library's clientele has increased the efficiency and responsiveness of its services to the Nation's needs by reviewing policies as well as practices on a continuing basis.

There are several particular happenings which have significantly altered the course of events, most of them involving groups or individuals external to the Library's own organization. The creation of the National Library of Medicine itself within the Department of Health, Education, and Welfare immediately responsible to the Surgeon General focused attention of his sophisticated staff on problems that have been shared, if not completely resolved, with sympathy, understanding and support. Mutual interest and respect are no whit lessened by the more recent transfer of the Library to the expanded National Institutes

of Health with whom the responsible officials and staffs have enjoyed the closest relationship, extending even to criticisms openly sought and freely given by both parties.

A report in October 1964 by Dr. Stafford L. Warren of the President's Commission on Mental Retardation called for the development of a university-based national system of libraries and information centers utilizing MEDLARS as a prototype analysis and control mechanism. Great public interest drew attention to the potential of such a development, to the National Library of Medicine as originator of MEDLARS, and the need for further national planning.

The Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology, composed of Federal science information specialists, to provide voluntary coordination of effective and compatible information systems was formed in the fall of 1963. The Director and members of the Library staff have served by request on panels, task forces, working groups and subcommittees concerned with:

Scientific and technical journal literature;
Operational techniques and systems;
Vocabulary compatibility;
Translations in social sciences; and
National Inventory of Serials.

A COSATI report issued in November 1965, based on exhaustive studies by Systems Development Corporation, called for development of national document handling systems in science and technology. The program

plans of the National Library of Medicine are entirely consistent with the COSATI recommendations which have been accepted by the Federal Council for Science and Technology and referred to the National Science Foundation for implementation.

A Federal Library Committee was formed in March 1965 recognizing a need for cooperation and concerted action among Federal libraries. Permanent members include the Librarian of Congress, the Directors of the National Library of Medicine and the National Agricultural Library, and a librarian representing each of the Executive Departments. Members of the staff of the National Library of Medicine serve on five of the six task forces sponsored by the Committee. One solid accomplishment is the development of completely compatible computer systems for conducting a variety of library functions, first realized during 1968.

Establishment of the President's National Advisory Commission on Libraries in 1967 and its subsequent review of library functions in contemporary society inevitably involved the National Library of Medicine. Two of the Board of Regents were selected by the President to serve on the Commission: William H. Hubbard, Jr., M.D., and Herman H. Fussler, Ph.D. The Deputy Director presented the Library's functions and program plans to the Commission.

International Activities: During May 1964 the Library entered into an agreement with the Agency for International Development whereby that agency provided positions and funds so that the Library might develop

services to support health activities in developing countries. Interlibrary loans, MEDLARS search and other reference services combine to be available to U.S./AID missions overseas and to institutions in countries designated by the Agency. The National Library of Medicine assisted in the development of the Medical Library at the University of Saigon and cooperated with AID and the American Medical Association in further planning for improved library services.

In January 1965 the National Library of Medicine was host to a number of organizations concerned with problems of medical education, biomedical research and international health activities in Latin America. Soon the Pan American Health Organizations asked for assistance in evaluating the medical library situation in South America. Two persons provided by the Library visited appropriate institutions in Brazil, Uruguay, Argentina, Chile, Columbia and Venezuela. The Pan American Health Organization consequently reviewed a proposal for the development of a Regional Medical Library for Latin America, which it formally accepted. An agreement has been concluded among PAHO, the Federal Government of Brazil, the Commonwealth Fund and the National Library of Medicine for joint development under PAHO guidance of the Library of the Escola Paulista de Medicine in Sao Paulo, Brazil. It is now providing supplemental medical library resources in South America.

The World Health Organization accepted an offer from the National

Library of Medicine to facilitate use of MEDLARS by members of the WHO staff and expert committees throughout the world. Two people are now being trained at the Library for that purpose. MEDLARS is being extended farther into the international scene under the auspices of the Organization for Economic Cooperation and Development. European member nations are introducing MEDLARS search technology in their own countries and in return are organizing to provide the National Library of Medicine with 50,000 indexed citations derived from their own national biomedical literatures.

MEDICAL LIBRARY ASSISTANCE ACT OF 1965

In his Health Message to the Congress early in 1964, President Johnson stated:

> "I am establishing a Commission on Heart Disease, Cancer and Stroke to recommend steps to reduce the incidence of these diseases through new knowledge and more complete utilization of the medical knowledge we already have."

The Commission, made up of persons prominent in medicine and public affairs, held its first meeting at the White House on April 17, 1964, and reported to the President in December. A report of the Subcommittee on Communications outlines the information processes in some detail and ends:

> "Opportunities for improving the handling of science information unfold from hour to hour. Given the backing of the medical community and the taxpayer, science information services can provide scientists, practitioners, and the public with instruments of intelligence as productive in their way as the electronmicrograph, electrocardiograms, or radiotracers. In an age when a message travels around the world in a second, it is unthinkable that it should take months or even years for physicians and their patients to learn essential medical truths." (4)

The Commission found the Nation's medical library system grossly inadequate for the task of serving as the primary vehicle for accomplishing the communication of information to scientists and practitioners on account of the serious lack of extramural support from the Federal government for libraries *per se*. They pointed out

that Public Health Service appropriations then totaled more than $1 billion, but less than $1 million accrued directly or indirectly to the extramural support of medical libraries. Recognizing the National Library of Medicine as the cornerstone of the Nation's medical library system through its development of the world's largest collection of medical literature and its sponsorship and operation of MEDLARS, the Commission recommended:

> "that the National Library of Medicine be authorized and adequately supported to serve its logical and necessary function as the primary source for strengthening the Nation's medical library system."(5)

The report also included specific recommendations for new authorities and for support of intramural and extramural activities essential to the implementation of the Commission's advice.

Companion bills S.597 and H.R. 3142 were introduced into the Congress on January 19, 1965, by Senator Lister Hill and Congressman Oren Harris respectively to provide a program of assistance for the Nation's medical libraries. An identical bill was introduced in the House of Representatives on March 19, 1965, by Congressman John E. Fogarty, who subsequently expressed the basic philosophy of the act:

> "It wisely assumes that private, local, and state resources will continue to carry most of the expense of our Nation's library system. At the same time it assumes that the leadership role of the NLM should be recognized, utilized and strengthened."

Rarely has a health legislation program received such extensive and unanimous support from so large a number of professional health organizations as well as library associations.

The Law as enacted, with the signature of President Johnson on October 22, 1965, provided authorization for a $105,000,000 program over a period of five years to provide support for medical library construction and renovation, the training of manpower, research and development, library resources, regional libraries, support for health-science scholars, and for biomedical scientific publications, and the establishment of branches of the National Library of Medicine should these be necessary. Having worked through the legislative process, the Extramural staff developed regulations and formal policy guidelines with the Board of Regents which were then cleared through official channels of the Executive Branch and published in the Federal Register July 13, 1966.

As described earlier in this paper, the Extramural effort with regard to (1) support of publications, through both domestic and PL-480 activities; (2) a modest research and development effort; and (3) graduate training in information sciences were begun through the existing authorities of the PHS. The Secretary of Health, Education, and Welfare designated the appointive members of the Board as the Advisory Committee for Extramural Programs charged to review and make final recommendations on appropriate grant applications to the Public Health Service.

With the advent of the Medical Library Assistance Act, the Extramural staff immediately developed procedures to implement all of the additional authorities which were made available. In addition

to the Publications and Translations Division, the Extramural Program added the Research and Training Division in 1964 and the Facilities and Resources Division in 1966.

The Board of Regents, acting as the "National Medical Libraries Assistance Advisory Board," was designated by the new statute as the policy advisory group to the Surgeon General in administration of these programs. Subsequently, the Director, National Library of Medicine, created two additional advisory bodies--the Manpower and Training Committee and the Facilities and Resources Committee, to provide initial review of applications for grants and awards as a preliminary to final recommendation by the Board of Regents. The Advisory Committee on Scientific Publications, for which the Publications and Translations Division had provided the secretariat, was transferred from the Library to the Division of Research Grants, National Institutes of Health, and renamed the Committee on Scientific Communications to broaden its responsibility by including review of projects in information sciences as well as the support of special publications.

The Extramural Program is based on three major efforts:

1. Institutional support--including facilities (construction), library resources development, and support for the operation of regional libraries;
2. Manpower development; and

3. Special biomedical communications projects--including research and development grants and contracts, special scientific projects, and publications support, both domestic and foreign.

The results of the new legislation are shown in Table VIII. Thus far the most important impact has been in manpower development and resources which reflects the priorities considered by the biomedical community and its librarians as the priorities of first order in upgrading their present capabilities. The table does not show the extensive demand for construction or renovation of facilities. Of 28 proposals in 1967, 9 were approved by the Advisory Committee, but fiscal constraints prevented funding of any of the proposals; comparable data for 1968 are: 21 proposals of which 12 were recommended for approval. Nine construction grants were awarded in 1968.

Since the inception of the program, resources grants have reached several hundred institutions including 11 types of academic libraries--medicine, dentistry, pharmacy, nursing, optometry, osteopathy, podiatry, public health, veterinary medicine, graduate science, and various combinations of these, hospitals, research institutes, professional society libraries, and state institutions.

Regional medical library grants have been made to Harvard, the University of Washington and the Library of the College of Physicians

in Philadelphia. There are approved applications in hand for three more and two more regions are expected to apply for support in the fall.

The training programs initiated through the Extramural Program under the additional authorities of the Medical Library Assistance Act have been described (v.s.).

The measures discussed thus far, which resulted from the new authorities, were directed toward the strengthening of institutions which could provide medical library services and for the development of the manpower to make such services available. There are clearly many additional problems, however, and a modest research program addressed itself to those matters which appeared to impede more rapid technical development of the system and which retarded the application of the new technology which was available. The question was often asked, might it be possible to take a giant step sometime in the foreseeable future, a revolutionary step rather than the evolutionary process which seemed to be an inevitability? The question was also asked as to what this might cost in men and money?

Unfortunately, the building of elaborate resources and facilities is no guarantee that services will be improved, communications enhanced, and the ultimate user benefited to any great extent. The program was directed, therefore to a better understanding of the Library's clientele. There was a need to be thoroughly knowledgeable in the information seeking behavior of the user, including his motivation,

to identify to whom information should be transmitted, and to have some idea as to when it was needed. Studies were needed on the best form and method for transmitting information, including how it should be "packaged" and, most important of all, what should be transmitted. Also, it was evident that the concern must range from the needs of the investigator in the active medical center and research institution to the general practitioner with access only to a small hospital library. This small program provided an unusual opportunity to widen the universe of workers relating to medical library problems and engage the thought and energies of able individuals who could not only solve the problems but, equally important, identify the problems which should be worked on and establish appropriate priorities. The general approach, then, was one of having an announced class of problems but not a totally preconceived list of projects and solutions.

The authority for the support of publications was directed particularly toward secondary publications which included the development of specifications for the procurement of abstracts, special bibliographies, critical reviews and, particularly, translations of the foreign medical literature. This program is carried out both here and abroad using the regular appropriations and PL-480 monies as available.

Public Law 89-291, the Medical Library Assistance Act of 1965, remains one of the most significant events in the history of the National Library of Medicine since its creation in 1956.

Marjorie P. Wilson, M.D., left the Library in 1967 and was succeeded by David F. Kefauver as Associate Director for Extramural Programs.

Rapid growth and its attendant publicity inevitably invite scrutiny of any Federal agency by a variety of interests, including the General Accounting Office. The National Library of Medicine has served as gracious host to a succession of auditors whose general reaction seems to be, "This is much more than a library." We prefer to think that the National Library of Medicine, with the complete support of both the executive and legislative branches of the Federal Government, is leading the biomedical community into revising its concepts of what their libraries can and should do. This brief narrative hits only the high spots; many more details are readily available in public documents which the Library will be happy to provide on request. On the other hand, we would hope that some who read these pages may be sufficiently interested to pay us a visit. The welcome mat is out!

Generalized MEDLARS performance curve

FIGURE I

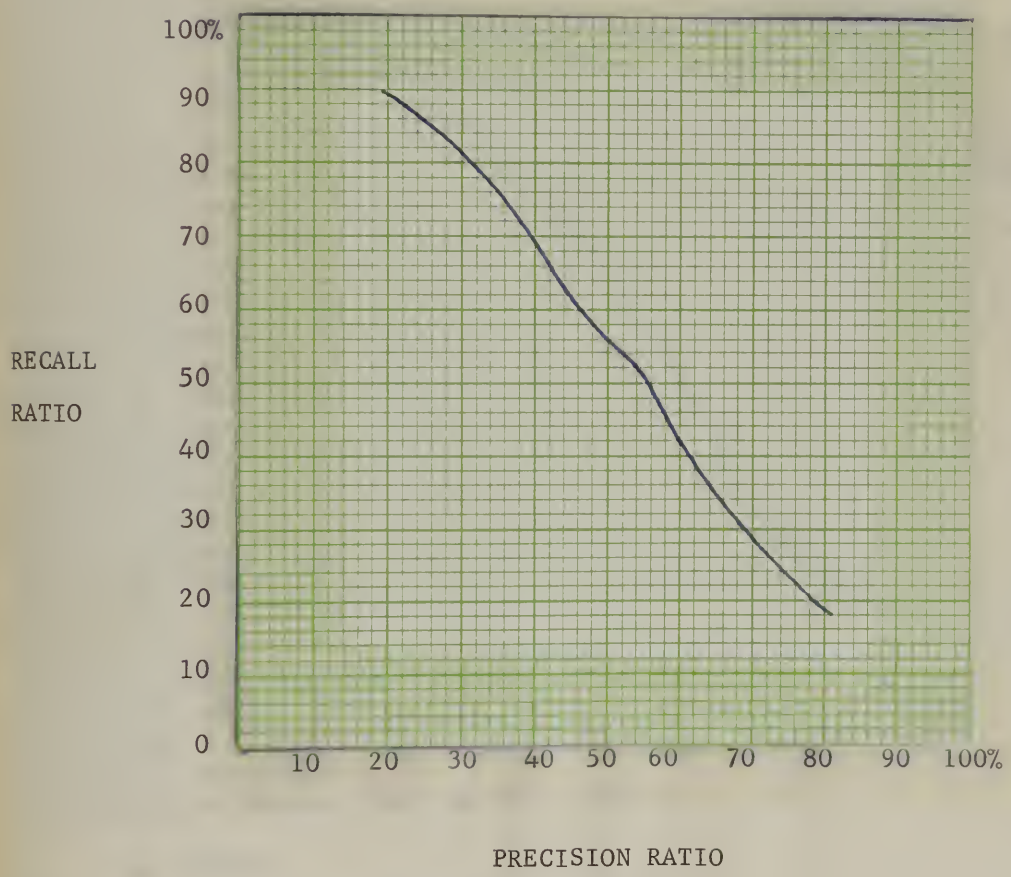

TABLE I

BOARD OF REGENTS

August 3, 1963

Dr. Norman Q. Brill
Professor of Psychiatry
University of California
Los Angeles, California

Dr. Russell A. Dixon
Dean, College of Dentistry
Howard University, Washington, D.C.

Dr. Herman H. Fussler
Director of the Library
University of Chicago
Chicago, Illinois

Dr. Alfred Gellhorn
Professor of Internal Medicine
College of Physicians and Surgeons
Columbia University, New York, N.Y.

Dr. Henry N. Harkins
Professor of Surgery
School of Medicine
University of Washington
Seattle, Washington

Dr. William N. Hubbard, Jr.
Dean, University of Michigan
Medical School, Ann Arbor, Michigan

Dr. Hugh H. Hussey, Jr.
Director, Division of Scientific
Activities, American Medical Association
Chicago, Illinois

Dr. Saul Jarcho
Associate Physician, Mount Sinai Hospital
New York, N.Y.

Dr. Robert M. Stecher
Clinical Professor of Internal Medicine
Western Reserve Medical School
Cleveland, Ohio

Dr. William L. Valk
Professor of Surgery
University of Kansas, Kansas City, Kansas

Ex Officio

Director, Biological and Medical Sciences,
National Science Foundation
Surgeon General, Department of the Army
Surgeon General, Department of the Navy
Chief Medical Director, Veterans Administration
Librarian of Congress
Surgeon General, Department of the Air Force
Surgeon General, U.S. Public Health Service

August 3, 1964

Dr. Hugh H. Hussey, Jr.,
Dr. Saul Jarcho,
Dr. Robert M. Stecher, and
Dr. William L. Valk
were replaced by

Dr. Walsh McDermott
Professor of Public Health and
Preventive Medicine
Cornell University Medical Center
New York, N.Y.

Dr. Morris Tager
Professor of Microbiology
Emory University
Atlanta, Georgia

Dr. Barnes Woodhall
Vice Provost, Duke University
Medical Center
Durham, North Carolina

TABLE I (continued)

August 3, 1965

Dr. Brill's term ended, and two new members were appointed:

Dr. William B. Bean
Professor of Internal Medicine
College of Medicine, State University of Iowa, Iowa City, Iowa

Dr. Stewart G. Wolf, Jr.
Professor of Medicine, School of Medicine
University of Oklahoma
Oklahoma City, Oklahoma

August 3, 1966

Dr. Alfred Gellhorn and
Dr. Henry Harkins
were replaced by

Dr. Kathryn M. Smith
Dean, School of Nursing
University of Colorado
Denver, Colorado

Mr. Alfred R. Zipf
Executive Vice President
Bank of America
Los Angeles, California

August 3, 1967

Dr. Russell A. Dixon,
Dr. Herman H. Fussler, and
Dr. William N. Hubbard
were replaced by

Dr. Bruno W. Augenstein
Vice President for Research
Rand Corporation
Santa Monica, California

Dr. Robert H. Ebert
Dean, Harvard Medical School
Boston, Massachusetts

August 3, 1968

Dr. Walsh McDermott,
Dr. Morris Tager, and
Dr. Barnes Woodhall
were replaced by

Dr. William Anlyan
Dean, School of Medicine
Duke University
Durham, North Carolina

Dr. Max Michael
Executive Director
Jacksonville Hospitals
Educational Programs
Jacksonville, Florida

Dr. George Teuscher
Dean, Northwestern University
Dental School
Chicago, Illinois

TABLE II

GROWTH AND ORGANIZATION OF THE STAFF

NATIONAL LIBRARY OF MEDICINE

1963 - 1968

	1963	1964	1965	1966	1967	1968
Office of the Director	32	41	40	51	49	10
Office of Administrative Management						35
Public Information Office						11
Research and Development					1	11
Intramural Programs	200	209	216	248	240	
Library Operations						200
Office of Associate Director				(23)	(17)	(11)
Technical Services	(60)	(60)	(59)	(57)	(56)	(55)
Reference Services	(68)	(70)	(69)	(68)	(69)	(70)
Bibliographic Services	(60)	(29)	(32)	(32)	(43)	(46)
History of Medicine	(12)	(13)	(15)	(18)	(19)	(18)
Data Processing		(37)	(41)			
Information Systems				(50)	(36)	
Office of Computer & Engineering Services						50
Extramural Programs	8	9	13	21	33	35
Toxicology Information Program					10	
Specialized Information Services						17
National Medical Audiovisual Center						127
TOTAL STAFF	240	259	269	320	333	496

TABLE III

GROWTH OF THE COLLECTION

ITEM	63	64	65	66	67	68
ound Monographs	293,230	300,322	306,842	315,745	327,183	338,413
Net gain	5,666	7,092	6,520	8,903	11,438	11,230
ound Serials	276,239	286,706	298,859	311,066	325,846	337,038
Net gain	5,366	10,467	12,153	12,207	14,780	11,192
heses	285,012	285,116	285,151	290,519	295,883	303,744
Net gain	130	104	35	5,368	5,364	7,861
amphlets	167,303	167,548	167,576	167,602	167,653	167,843
Net gain	1,394	245	28	26	51	190
on book Material	61,222	62,243	63,391	65,209	69,781	72,712
Microfilm	2,883	3,311	4,150	4,593	6,864	8,268
Net gain	360	428	309	443	2,271	1,404
ortraits & Pictures	58,339	58,932	59,241	60,616	62,917	64,444
Net gain	834	593	309	1,375	2,301	1,527
TOTAL	1,098,006	1,116,935	1,131,819	1,165,141	1,201,346	1,234,750

TABLE IV

ACQUISITIONS

	1963	1964	1965	1966	1967	1968
Prospects searched, not in Library	26,806	29,494	27,151	32,919	29,607	13,664
Prospects searched, Library had	11,912	15,468	21,470	13,087	9,812	11,997
Ordered	15,516	14,555	14,803	14,755	14,552	5,025
Serials added	956	1,511	1,299	1,925	1,168	1,299
Total serials	13,888	15,358	16,557	18,428	19,650	21,066
Cost of acquisitions	$ 87,000	$ 108,000	$ 124,414	$ 161,286	$ 209,900	$ 204,300
Rare books	($ 11,873)	($ 14,607)	($ 12,234)	($ 26,319)	($ 31,095)	($ 23,564)

TABLE V

LIBRARY SERVICES

	1963	1964	1965	1966	1967	1968
Articles indexed	139,462	144,057	151,635	164,545	168,310	192,923
Requests	233,647	243,464	263,464	278,340	278,580	261,938
Filled	88%	88%	87%	84%	86%	86%
Readers	21,484	26,133	26,719	37,418	31,666	31,681
Reference requests	13,418	20,154	20,931	21,871	25,514	24,750
Interlibrary loans	134,918	130,555	148,558	145,076	148,235	126,839
MEDLARS searches distributed			1,623	3,035	4,733*	8,100

* 3,889 received and processed at the National Library of Medicine,
844 processed at the National Library of Medicine but requests received at MEDLARS stations.

TABLE VI

POOR PAPER PHOTOGRAPHED

Year	Pages
1963	820,000
1964	1,062,433
1965	480,011
1966	1,302,092
1967	825,030
1968	737,397

TABLE VII

RECURRING BIBLIOGRAPHIES

Title	Sponsor	Distribution
Artificial Kidney	NIAMD	Limited distribution
Surgery of Hand	Professional Society	Subscription
Medical Education	Professional Society	Subscription
Cerebrovascular Bibliography	NINDB - NHI	Limited distribution
Diabetes Literature Index	NIAMD	Limited distribution
Endocrinology Bibliography	NIAMD	Limited distribution
Fibrinolysis, Thrombolysis and Blood Clotting	NHI	Limited distribution
Index to Rheumatology	Professional Society	Subscription
Index to Dental Literature	Professional Society	Subscription
International Nursing Index	Professional Society	Subscription
Toxicity Bibliography	NLM	Limited distribution
Anaesthesiology Bibliography	Professional Society	Membership

TABLE VIII

IMPACT OF MEDICAL LIBRARY ASSISTANCE ACT OF 1965

Grants for:	1965		1966		1967		1968	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research	6	46,491	24	605,940	31	582,000	51	1,261,000
Publications			7	200,000	15	413,000	14	371,813
Training & Fellowships	2	65,000	10	465,169	17	812,000	18	922,357
Special Scientific Projects	1	8,406			2	33,000	3	53,958
Resources			3	23,998	258	3,339,000	373	3,548,001
Regional Medical Libraries					1	105,000	3	680,128
Construction							9	10,000,000
TOTAL GRANTS	9	119,897	44	1,295,107	324	5,284,000	471	16,837,257

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